CLAIMS

I Claim:

1. A photosololysis reactor, comprising a generally cylindrical vessel with an immersion well inside said vessel, said immersion well being transparent to ultraviolet light, an ultraviolet light source within said immersion well, an ultrasound source also inside said vessel, and a metal partition with a reactant flow-through hole also inside said vessel.

2. The reactor of Claim 1 which also comprises inlet and outlet ports for fluid to flow through said reactor.

3. The reactor of Claim 1 wherein the metal partition is between said immersion well and said ultrasound source.

4. The reactor of Claim 1 wherein the metal partition is aluminum.

5. The reactor of Claim 1 wherein the metal partition is stainless steel.

6. A photosonolysis reactor comprising a generally cylindrical vessel with side walls which are transparent to ultraviolet light, an ultrasound source inside said vessel, an ultraviolet light source outside of, and in operative relationship with, said vessel, and a metal partition with a reactant flow-through hole also inside said vessel.

7. The reactor of Claim 6 which also comprises inlet and outlet ports for fluid to flow through said reactor.

8. The reactor of Claim 6 wherein the metal partition is between the transparent side walls and the ultrasound source inside said vessel.

9. The reactor of Claim 6, wherein the metal partition is aluminum.

10. The reactor of Claim 6 wherein the metal partition is stainless steel

11. A photosonolysis reactor comprising a generally cylindrical vessel with an immersion well inside said vessel, said immersion well being transparent to ultraviolet light, an ultraviolet light source within said immersion well, an ultrasound source outside of, but in operative relationship with, said vessel, and a metal partition with a reactant flow-through hole also inside said vessel.

12. The reactor of Claim 11 which also comprises inlet and outlet ports for fluid to flow through said reactor.

13. The reactor of Claim 11 wherein the metal partition is between the immersion well and the ultrasound source.

14. The reactor of Claim 11, wherein the metal partition is aluminum.

15. The reactor of Claim 11, wherein the metal partition is stainless steel.

16. A method for decomposing halogenated organic compounds in water, which comprises simultaneously contacting the water and halogenated organic compounds with ultraviolet light and ultrasonic waves in a reactor vessel, said ultraviolet light being from a source within an immersion well transparent to ultraviolet light in said water in said reactor vessel, and there being a metal partition with a reactant flow-through hole also within said reactor vessel.

17. A method for decomposing halogenated organic compounds in water, which comprises simultaneously contacting the water and halogenated organic compounds in a reactor vessel with ultraviolet light and ultrasonic waves, said ultraviolet light being from a source outside of

said reactor vessel, and there being a metal partition with a reactant flow-through hole also within said reactor vessel.

18. A method for decomposing halogenated organic compounds in water, which comprises simultaneously contacting the water and halogenated organic compounds with ultraviolet light and ultrasonic waves, said ultraviolet waves being from a source outside of said water, and there being a metal partition with a reactant flow-through hole also in said water.